Microwave systems

Satellite systems and GNSS

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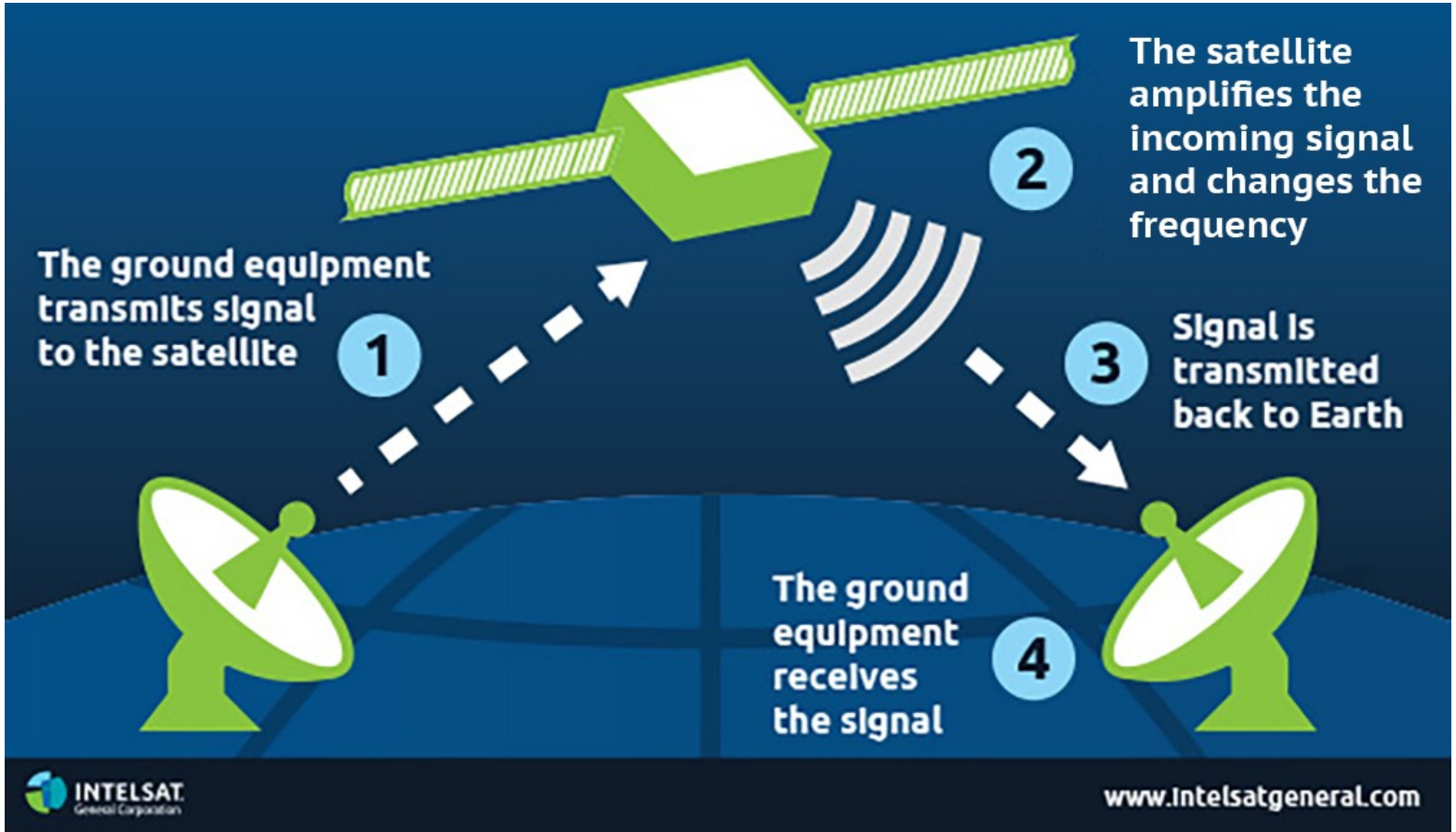
Applications of microwaves

- Microwave waves (300MHz (1m) -300GHz (1mm))
- **RADAR**
- **Satellite communications**
- Mobile communication
- Terrestrial communication links
- **GNSS – Global Navigation Satellite Systems**;
- Wearable technology
- Broadcasting
- Radio navigation
- Surveillance systems
- Remote sensing
- Medical (magnetic resonance imaging, microwave imaging).

Satellite Communications

- Telecommunications – over large distances;
- Ability to access remote areas;
- Applications: Satellite phones; Direct broadcast; Military; GPS

- Critical considerations:
  - Power
  - Coverage

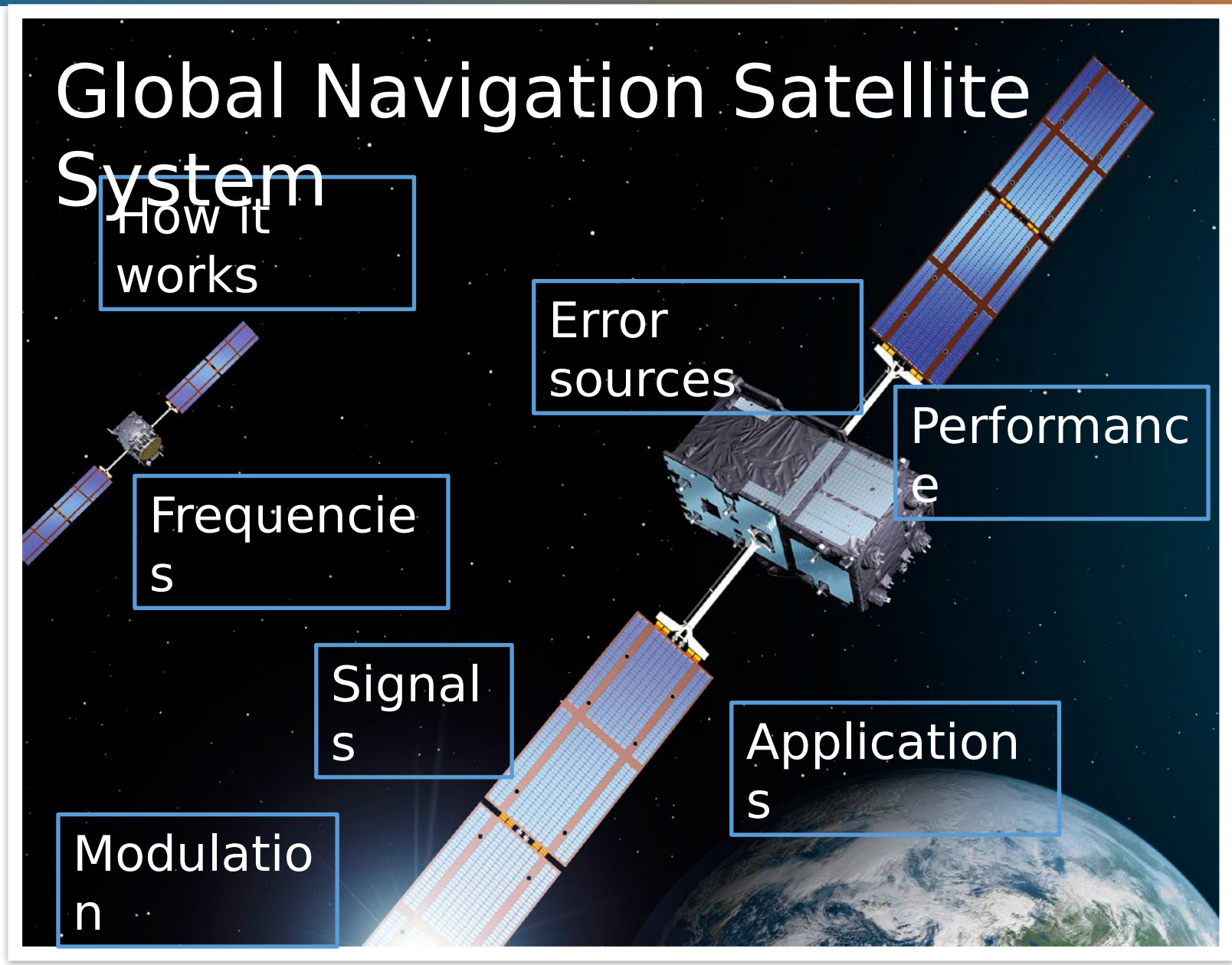


Microwave Systems topic will cover:

Microwave propagation and Satellite Communications

- Dominant propagation effects that affect microwave signal propagation in free space;
- Ray model for fading and sky refraction
- Design satellite communication system: uplink and downlink design;
- The overall noise in the receiver.
- Multiple access techniques used in satellite communications

GNSS


Global Navigation Satellite System
How it works
Error sources
Performanc e
Frequencie s
Signal s
Application s
Modulatio n

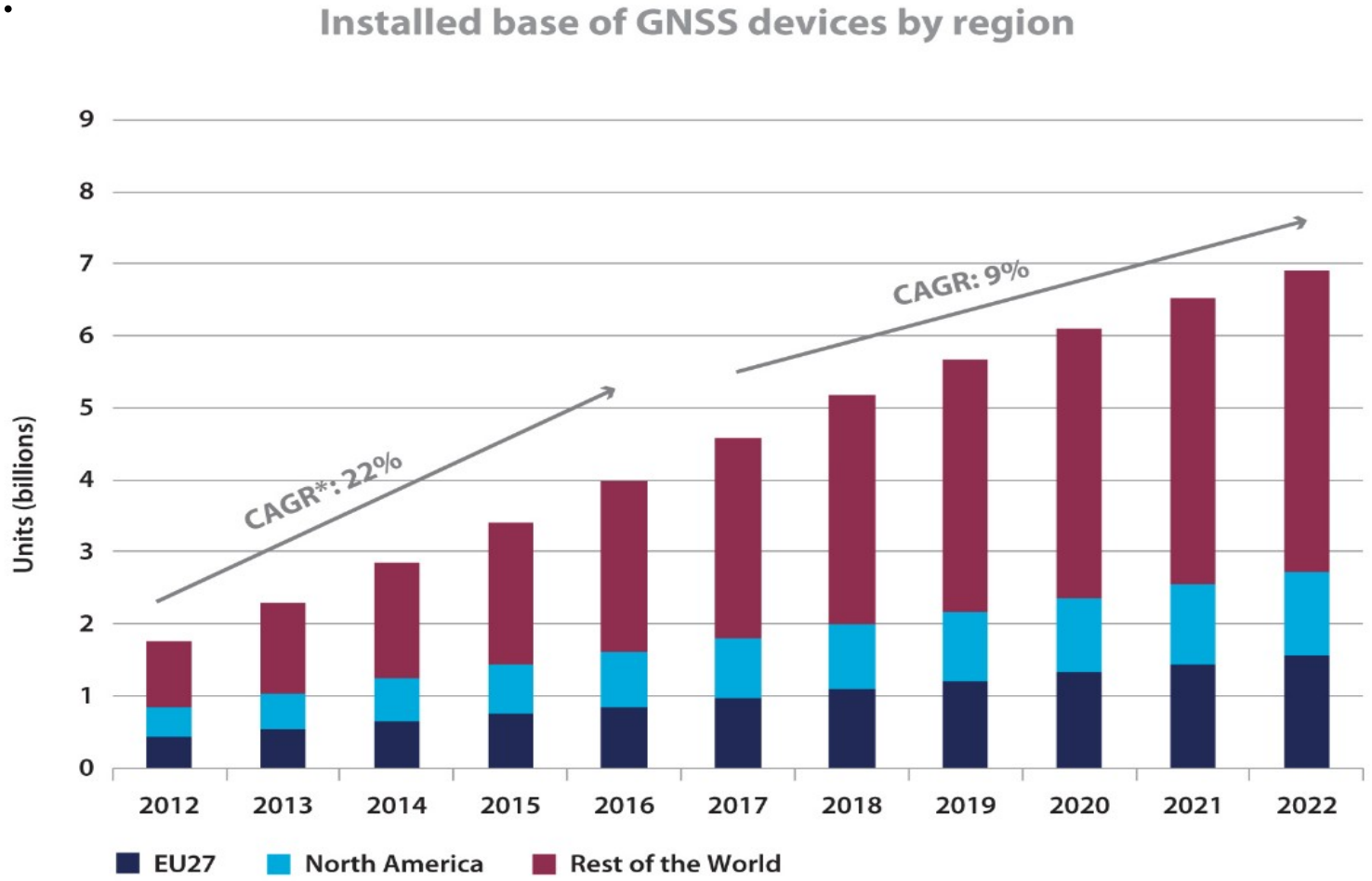
Global Positioning System

32 medium earth orbiting satellites in 6 different orbital planes.

Part of Global Navigation Satellite System (GNSS) – infrastructure for determining position and velocity by processing satellite signals.

Applications:

- Tracking/mapping Devices
- Industrial Machinery
- Sea vessels
- Air navigation
- Automobiles



http://gpsworld.com/a-glowing-report-doth-not-a-golden-future-make/

Microwave Systems topic will cover:

GNSS

- What is GNSS and how does it work
- What is GNSS used for (applications)
- Received power and noise levels
- Modulation and coding in GNSS signals
- Basic receiver principals and errors

Microwave Systems topic will cover:

Microwave propagation and Satellite Communications

- Dominant propagation effects that affect microwave signal propagation in free space;
- Ray model for fading and sky refraction
- To be able to design satellite communication system: uplink and downlink design;
- How to minimise the overall noise in the receiver.
- Multiple access techniques used in satellite communications

GNSS

- What is GNSS and how does it works
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